



United States
Department of
Agriculture

Forest
Service

Southwestern Region
Forest Health
Arizona Zone Office

2500 S. Pine Knoll Drive
Flagstaff, AZ 86001-6381
FAX (928) 556-2130
Voice (928) 556-2073

File Code: 3420
Route To:

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Subject: Bark Beetle Activity in Recreation Sites on the Black Mesa RD, Apache-Sitgreaves NFs (blackmesard)

To: District Ranger, Black Mesa RD

I was requested to assess bark beetle activity in developed recreation sites on the Black Mesa RD, Apache-Sitgreaves NFs. On September 21 – 22, 2005 I evaluated recreation sites on the District and discussed potential prevention and suppression projects Gayle Richardson (District Silviculturist). I describe in this report what bark beetle activity was observed in these areas, summarize the effectiveness of the preventive spray project, and make recommendations to minimize bark beetle impacts in the future.

Bark beetle activity on the Apache-Sitgreaves NFs

A detailed summary of the aerial detection survey results will be provided to the Forest at a later date; however, our preliminary analysis showed that ponderosa pine mortality has decreased in 2005 compared with recent years. This trend of decreased bark beetle activity is similar to what has been observed in the majority of Arizona during 2005. Nonetheless, there are still areas that are experiencing considerable pine mortality and the population of bark beetles is still relatively high throughout portions of the District.

Inspection of fading trees and collected specimens determined that *Ips* beetles (*Ips pini*, *I. lecontei*, and *I. calligraphus*) and western pine beetle (*Dendroctonus brevicornis*) were the primary cause of ponderosa pine mortality on the Black Mesa RD. *Ips pini* (the pine engraver beetle) is widespread throughout the West and can occasionally reach outbreak proportions (Kegley, et al., 1997). *Ips lecontei* (Arizona 5-spined ips) populations have increased throughout much of the District. This *Ips* species has historically been considered an aggressive ponderosa pine killer below the Mogollon Rim (Massey and Parker, 1981; Parker, 1991) and has caused extensive tree mortality on the Prescott and Tonto NF's over the previous three years. Several of the larger-diameter pine with tops infested by *Ips* also have western pine beetle in the lower portion of the trunks. Populations of this bark beetle increased throughout much of Arizona in 2003 and 2004.

Bark beetle activity in developed recreation sites

Trees growing in developed recreation sites are often stressed due to repeated damage caused by campers and soil compaction caused by roads and large vehicles parked off-road. During periods of drought or below-average precipitation, such has been occurring over the last few years, these trees can become extremely stressed. This is further exacerbated by the relatively high density of ponderosa pine growing in several of the campgrounds. When trees are growing at high densities, there is a greater amount of inter-tree competition for limited resources such as



light, water, and nutrients (Kolb, et al., 1998). The combined effect of these factors is lower production of defensive compounds by the trees and, consequently, increased susceptibility to bark beetle attack. Bark beetles may also prefer these dense stands, as compared to more open stands, due to microclimate differences (Amman and Logan, 1998).

On September 21, 2005, I examined developed recreation and administrative sites on the Black Mesa RD. I conducted a similar survey of these same sites the previous three falls (site visit reports dated October 22, 2002; October 3, 2003; October 18, 2005). My surveys of the recreation sites consisted of quick walkthroughs looking for fading trees, pitch tubes, and boring dust. It is important to note that a more intensive survey may find additional infested trees and additional trees may have become infested after my survey was completed. Therefore, the numbers of infested trees reported here should not be considered absolute. In general, bark beetle activity has remained high across lower elevation locations, such as near the Black Mesa District Office and towns of Heber and Overgaard, and areas impacted by the Rodeo-Chediski Fire. Bark beetle activity at recreation sites in other parts of the Districts appeared to be lower in 2005 than in 2004. A brief summary is provided for each site.

The District has now completed thinning treatments at many of the recreation and administrative sites. The general prescription called for the removal of trees less than 6 inches dbh while maintaining a 10 ft. by 10 ft. spacing, plus removal of all dying pine less than 9 inches dbh. The thinning and infested tree removal treatments has improved growing conditions for residual trees of many recreation sites and will likely reduce the long-term susceptibility to bark beetle attack.

Black Mesa District Office – Twenty-three bark beetle-killed ponderosa pine trees were observed within the immediate area of the compound. Many of these trees were currently infested with western pine beetle and *Ips* beetles. Other bark beetle-infested trees were observed just outside the compound area; for example, several currently infested trees were seen south of the compound and also on the north-side of Highway 260.

Tall Timbers Park – Three current infested ponderosa pine trees were found at the Park. Two of these trees were very large yellow pines attacked by western pine beetle (**Figure 1**). Several additional infested trees were observed just south of the Park.

Camp Shadow Pines & Black Mesa Work Center – No current infested trees were found at the Camp or Work Center. One current infested and four previously infested (likely attacked late 2004) were seen outside of the developed areas.

Canyon Point Campground, Large Group Area, and Small Group Area – Eighteen current infested and 15 previously infested (attacked late 2004 or early 2005) were seen within this developed recreation area. Many of these trees are large yellow pines currently infested with western pine beetle. Additional current infested trees and recent mortality were observed adjacent to the recreation site in areas burned during the Rodeo-Chediski Fire.



Figure 1. Large yellow pine currently infested with western pine beetle at the Tall Timbers Park.

Rim Campground – Two current infested and two previously attacked ponderosa pine trees were found at this recreation site.

Gentry Lookout Campground – Four currently infested ponderosa pine trees were located at the entrance to this recreation site.

Sinkhole Campground – No new mortality was found at this recreation site.

Woods Canyon Group Area – No new mortality was found at this recreation site.

Aspen Campground – Seven currently infested and 13 previously infested (attacked late 2004 or early 2005) were seen within the immediate area of this large recreation site.

Crook Campground – Two current infested and four previously infested (attacked late 2004 or early 2005) ponderosa pine was seen within the immediate area of this recreation site.

Mogollon Campground – Only one currently infested ponderosa pine trees was observed at this recreation site.

Spillway Campground, Spillway Group Area and Amphitheater – No new pine mortality was observed within this recreation site.

Rim Visitor Center – One current infested and two previously infested (attacked late 2003 or early 2004) were seen within the immediate area of the Visitor Center area. This area was severely impacted by *Ips lecontei* in the fall of 2003.

Black Canyon Rim Campground – One currently infested yellow pine and four previously infested were observed within the vicinity of this recreation site.

Effectiveness of preventative sprays for bark beetles in recreation sites

I describe here the effectiveness of the 2005 spray project to protect high value trees from bark beetle attack in several of the developed recreation and administrative sites. Trees were sprayed with Sevin SL at recreation and administrative sites across the Black Mesa District during April 2005. None of the more than 2,000 trees sprayed were successfully attacked by bark beetles despite heavy beetle pressure in many of the areas treated. Therefore, the spray treatment continues to be very effective at preventing bark beetles from successfully attacking these high value trees.

Recommendations

Based on the current level of bark beetle activity within the immediate area and adjacent to the Black Mesa RD administrative site, the Tall Timbers Park, and the Canyon Point Recreation area, trees within these sites continue to be highly susceptible to beetle attack. Therefore, a combination of removal of infested trees and application of preventive insecticide sprays is recommended for these there sites. Based on the reduction in bark beetle activity at the other recreation sites on the District, I do not feel that spraying is required there.

In the short-term, prompt removal of currently infested trees will help to reduce the immediate local population of beetles. However, because these insects are very common, removal of infested trees is not a guarantee of protection. Therefore, this approach is generally recommended in combination with the long-term preventive approaches of thinning and in the

short-term preventative spraying while beetle populations remain high. It is recommended that the infested trees be removed yet this fall before the brood completes their development and adult beetles emerge. Felling of infested trees will not kill developing brood; infested trees must either be removed from the site or treated on site.

Funds may be available for FY2006 from Forest Health Protection to manage bark beetle activity. Requests for these funds should be in no later than October 15, 2005.

If you have any questions regarding my assessment of current bark beetle activities within the project area, its potential effect on residual standing trees, or my recommendations, please let me know. I can be reached at (928) 556-2074.

/s/ Joel D. Mcmillin
JOEL D. McMILLIN
Entomologist, Forest Health, Arizona Zone

cc:
Deb Bumpus
Gayle Richardson
John Anhold
Leonard Lucero
Debra Allen-Reid
Kathleen Klein
Mailroom R3 Apache Sitgreaves

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